

WHAT IS CLAIMED IS:

1. A method for operating a liquid drop emitter, said liquid drop emitter comprising a chamber, filled with a liquid, having a nozzle for emitting drops of the liquid; a thermal actuator having a cantilevered element extending from a wall of the chamber and a free end residing in a first position proximate to the nozzle for exerting pressure on the liquid at the nozzle, the cantilevered element including a first layer constructed of an electrically resistive material patterned to have a first resistor segment and a second resistor segment and a coupling device, and a second layer constructed of a dielectric material having a low coefficient of thermal expansion and attached to the first layer; and electrodes connected to first and second resistor segments to apply an electrical pulse to heat the first layer, the method for operating comprising:

(a) determining an electrical pulse energy, E_{\max} , and power, P_{\max} , which results in the formation of vapor bubbles in the liquid contacting the cantilevered element near the coupling device;

(b) applying an electrical pulse of energy E_{op} and power P_{op} to eject a liquid drop, wherein $E_{\text{op}} < 0.9 E_{\max}$, and $P_{\text{op}} < 0.9 P_{\max}$.

2. A method for operating a liquid drop emitter, said liquid drop emitter comprising a chamber, filled with a liquid, having a nozzle for emitting drops of the liquid; a thermal actuator having a cantilevered element extending from a wall of the chamber and a free end residing in a first position proximate to the nozzle for exerting pressure on the liquid at the nozzle, the cantilevered element including a first layer constructed of an electrically resistive material patterned to have a first resistor segment, a second resistor segment and a coupling segment, and a second layer constructed of a dielectric material having a low coefficient of thermal expansion and attached to the first layer; and electrodes connected to first and second resistor segments to apply an electrical pulse to heat the first layer, the method for operating comprising:

(a) determining an electrical pulse energy, E_{\max} , and power, P_{\max} , which results in the formation of vapor bubbles in the liquid contacting the cantilevered element near the coupling device;

(b) applying an electrical pulse of energy E_{op} and power P_{op} to eject a liquid drop, wherein $E_{\text{op}} < 0.9 E_{\max}$, and $P_{\text{op}} < 0.9 P_{\max}$.